Innovation Management Practices in a Technology-Based Company: A Case Study of a University Spin-off

Práticas de Gestão da Inovação em uma empresa de Base tecnológica: Um estudo de Caso de Spin-off Universitário

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ABSTRACT

The general aim of this study was to investigate the main innovation management practices in a technology-based company and to identify its technological trajectory. Innovation management processes in organizations are strongly interrelated with the management tools used by the professional teams in these organizations and are stimulated by their internal culture and management. This research is designed as a case study, and the company being researched is a technology-based company, created from a university spin-off. In the field research, 14 semi-structured interviews were conducted. Cooperation with the university and the influence of senior management are visible in the trajectory, relationships and training of the technical staff. A hybrid structure was identified in the tactical management of product and process development, in addition to the systematic use of risk management tools, portfolio management and monitoring of the competitive environment, with a strong influence of financial management at all stages of the process, directly impacting innovation. In addition, partnerships were of paramount importance for the company to achieve its objectives.
Keywords: Innovation management. Innovation practices. Spin-off. Technological trajectory.

RESUMO

Este estudo teve como objetivo geral investigar as principais práticas de gestão da inovação em uma empresa de base tecnológica, buscando ainda identificar sua trajetória tecnológica. Os processos de gestão da inovação nas organizações estão fortemente inter-relacionados com as ferramentas de gestão utilizadas pelas equipes de profissionais dessas organizações e são estimulados pela sua cultura interna e pela gerência. Esta pesquisa se delineia como um estudo de caso, e a empresa objeto da pesquisa é de base tecnológica, criada a partir do spin-off universitário. Na pesquisa de campo, foram realizadas 14 entrevistas semiestruturadas. A cooperação com a universidade e a influência da alta administração são visíveis na trajetória, nos relacionamentos e na capacitação do corpo técnico. Foi identificada uma estrutura híbrida no gerenciamento tático do desenvolvimento de produtos e processos, somada ao uso sistemático de ferramentas de gestão de riscos, gestão do portfólio e monitoramento do ambiente competitivo, com uma forte influência da gestão financeira em todas as fases do processo impactando diretamente a inovação. Além disso, as parcerias foram de suma importância para a empresa atingir seus objetivos.

Palavras-chave: Gestão da inovação. Práticas de inovação. Spin-off. Trajetória tecnológica.

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1 INTRODUCTION

The landscape is changing in favor of companies that mobilize technological advances and knowledge in their products and services and in the way they create, develop and offer them. From this perspective, competitive advantages related to the assets or size of firms are declining; the focus is no longer on the pursuit of efficiency and competitiveness, based on cost reduction and process improvement, but on the generation of innovation, consolidating itself as a key element for adding value and the sustainability of organizations in an increasingly competitive contemporary environment (Dunford *et al*., 2013; Varandas Junior; Salerno; Miguel, 2014).

Innovation management in organizations is a complex process with strong interdisciplinary characteristics and its practice cuts across a number of functional activities in an organization (Baregheh; Rowley; Sambrook, 2009). To do this, companies have to develop a series of tasks and actions for the process of generating innovation, which together can be called innovation management practices (Gavira *et al*., 2007). In addition, most improvements are localized and specific to each company, product and market during the investment phase and during the operational life of each project, when a flow of incremental improvements is incorporated into the system (Bell; Pavitt, 1993).

To resolve this issue, it is necessary to analyze not only behavioral and cultural characteristics, which are unique and distinct in each company, but also to take a more comprehensive and holistic view of the organization, considering the concern for the whole, that is, the various parts inside and outside the organization (Felizola *et al*., 2024; Moreira; Stramar, 2014, p. 194)

Considering the relevance of innovation management practices for organizations, the topic has aroused the interest of several researchers, including the theoretical works of Tidd, Bessant e Pavitt (2008), Coral *et al*. (2008), Temaguide (COTEC, 1998), Goffine e Mitchell (2010), Tidd e Bessant (2015), Quadros (2008), Salerno *et al*. (2009) e Silva, Bagno e Salerno (2014).

In addition, there has been an increase in applied research into innovation management practices in organizations (Natume; Carvalho; Francisco, 2008; Vita *et al.*, 2020; Machado; Luchese; Bencke, 2019; Gomes *et al.*, 2021; Alves *et al*., 2021; Vasconcelos, Santos, Andrade, 2021; Wittmann; Maçaneiro, 2018; Carvalho; Roland; Lourenção, 2022). However, most of these studies deal with multinational companies and specific sectors, such as aeronautics, agriculture, IT and pharmaceuticals, i.e. generally large companies with structuring and training processes that are not university-based. There is therefore a lack of studies exploring the development of innovation management practices in university-based technology companies.

Therefore, a question that is still unclear is: how do the innovation management practices of a technology-based company work in a highly competitive and high-cost environment? With this in mind, this study aims to investigate the specific innovation management practices of a technology-based company, based on the methodologies and tools proposed in the innovation octagon and the Temaguide model.

The results of this research contribute to the literature by shedding light on a subject that has not yet been explored and by providing guidance on how innovation management practices are present in this particular type of company and how they impact it. It also adds new knowledge about the main processes in this type of business, which mainly revolve around product portfolio management, finance and partnerships, which for a better understanding have been divided into four phases.

In addition to this introduction, this paper presents the theoretical framework, which addresses the theoretical aspects of the research, such as innovation management and its practices. It is followed by section 3, which highlights the research's methodological procedures. Finally, the results and final considerations are presented.

2 THEORETICAL FRAMEWORK

This section deals with the essential theoretical contributions on innovation management, its practices and tools, and the concept of technology-based companies.

2.1 Innovation management and its importance

Academics and managers have long discussed the nature of innovation and its importance for an organization's growth and competitive advantage (Hasseb *et al*., 2019; Kitsuta; Quadros, 2020; Yousef Obeidat *et al*., 2017; Tidd; Bessant, 2015; Carvalho *et al.*, 2011). The implementation of the innovation generation process in an organization, however, is an issue that is still unclear. For example, how to recognize what type of innovation management is necessary for each company or situation (Lopes *et al.*, 2016). However, the innovation management process includes different types of innovation, which can be product, process, marketing, organizational, among other names. However, it is more noticeable in products and/or processes, as it highlights the technology required for development (Fayet, 2020).

Kotsemir and Meissner (2013) pointed out that in innovation studies there is a growing concern about innovation being understood as a process, a flow of non-linear activities, aimed at solving a problem by combining existing knowledge, generating knowledge and using it to solve a problem. This finding points to the challenges and complexity of innovation management, the condition of the surrounding structure, and the multiple sources of information, knowledge and fields of application (Machado; Luchese; Bencke, 2019).

Innovation management starts with creativity, then defining strategies, setting priorities, evaluating ideas, managing projects and monitoring results (Scherer; Carlomagno, 2016). The company also needs to clearly define its future strategies, having a systemic, continuous and controlled innovation management process, where the optimization of partnership processes and the alignment of research with the demands of the productive sector stand out (Ayroza; Pedroza Filho, 2024).

For Schreiber, Silva and Nunes (2021, p. 68), the implementation of an innovation management system can stimulate the organization to change "the current course of action or situation, circumscribed by premises and organizational structures". The implementation of efficient and effective innovation management requires the use of innovation management techniques and practices that can guide the construction of organizational processes through which innovation should be conducted (Albors-Garrigos; Igartua; Peiro, 2018).

2.2 Innovation management practices and tools

A literature review by Gomes *et al.* (2021) identified seven dimensions of good management practices: critical, economic, people management, innovation, quality, project management and production management. Along the same lines, Alves *et al.* (2021) present another way of understanding innovation management through the approach of ordinary management practices, which can be applied from people's daily lives, experienced in their day-to-day work.

The innovation management process is strongly interrelated with management tools and the organization's internal culture (Souza, 2003). According to the same author, these tools help to collect, classify, present and process information for planning and managing innovation.

The diversity of nomenclatures used in the literature makes a precise definition of a management tool quite difficult. For Marques (2016), management tools can be conceptualized as managerial techniques that help managers' decision-making, institutional management, improve thinking and indicate the best path for initial action.

Pfitzner, Salles Filho and Brittes (2016, p. 6) also point out that tools are like means of carrying out actions, responsible for systematizing, ordering and scripting innovation, and are present in each of the processes. Therefore, tools are the technological support for management practices.

There are several studies in the literature that propose innovation tools and practices, including the Octagon of Innovation Diagnosis (Scherer; Carlomagno, 2016) and those described by the Cotec Foundation (Temaguide), which will provide the basis for the discussions in this paper.

2.2.1 Innovation Octagon Diagnosis

Among the different applications that have the same objective of structuring, organizing and systematizing these practices and techniques in companies, there is the Innovation Octagon, developed by Scherer and Carlomagno (2009), which works as a tool to help companies manage innovation and serves as a conceptual basis for practical application in companies (Scherer; Carlomagno, 2016).

The Octagon of Innovation is a tool developed to help diagnose innovative potential and design management policies to improve its performance. Scherer and Carlomagno (2016) structured the tool according to eight dimensions, described below according to Scherer and Carlomagno (2016) and Miranda *et al*. (2019): Innovation strategy, Relationships for innovation, Innovation culture, People for innovation, Structure for innovation, Innovation process, Funding for innovation, Leadership for innovation.

2.2.2 Cotec Foundation

TEMAGUIDE (*Technology Management* & *Guide*) refers to a compendium of knowledge and tools on innovation management organized by COTEC (1998), and is the result of research carried out by a group of European organizations: COTEC Foundation (project coordinator), SOCINTEC, CENTRIN (University of Brighton), IRIM (University of Kiel) and the R&D Unit of Manchester Business School, based on a survey of European small and medium-sized enterprises. TEMAGUIDE proposes an innovation management model based on five aspects: Mapping (SCAN), Focus (FOCUS), Resources (RESOURCE), Implementation (IMPLEMENT) and Learning (LEARN) (COTEC, 2023).

According to Temaguide, innovation management tools can help with: project management; preparing a new project in advance; preparing a product for market launch; increasing the company's performance; among others. Temaguide, module I from 1999, refers to a process of selecting various techniques used by different companies to help users manage technology and innovation. It has 18 practices with specific objectives and formal techniques (Table 1) (COTEC, 2023).

Table 1 - Innovation Management Tools

TOOLS	
External information	Market analysis
	Technological prospecting
	Bechmarking
	Patent analyzes
Internal information	Intellectual property management
	Audits

	Environmental management
Work and resources	Project management
	Project evaluation
	Portfolio management
Group work	Network work
	Working in teams
	Interface management
Ideas and troubleshooting	Value analysis
	Creativity
Efficiency and flexibility	Continuous improvements
	Change management
	Lean production

Source: Adapted from COTEC (1999)

2.3 Technology-based companies

According to Sánchez Ocampo, Iacono and Leandro (2019), companies seek to combine scientific knowledge with technological development in order to adopt innovations that allow them to be more competitive. Technology-based companies (TBEs) are ventures focused on creating new products and services with current technological tools; they also work on improving existing products and services.

EBTs are organizations that use knowledge as a strategic component for their competitiveness and make significant technological efforts, since they focus a large part of their efforts on developing and manufacturing products that systematically integrate new technologies (Toledo *et al*., 2008).

In the process control automation sector, EBTs were considered to be companies that are part of the industrial automation industry, involved in product development and production activities aimed at controlling manufacturing processes through the application of mechanical, electronic, telemetry and computer technologies (Jugend; Silva; Toledo, 2005).

These concepts emphasize the use of technology as a basic input in the production process of this type of company, where information and knowledge management are requirements for maintaining competitiveness.

3 METHODOLOGICAL PROCEDURES

In terms of approach, this research is qualitative in nature. In general, investigations that focus on qualitative analysis have complex or strictly particular situations as their object. Studies using a qualitative methodology can describe the complexity of a given problem, analyze the interaction of certain variables, understand and classify dynamic processes experienced by social groups (Richardson, 2015; Gerhardt; Silveira, 2009).

This research is also a case study, a modality widely used in the social sciences. In this context, a case study is seen as an empirical investigation that "investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and the context are not clearly defined", as is generally observed in the social sciences (Yin, 2001, p. 32; Eisenhardt, 1989).

The company at the center of the research is a provider of intelligence solutions for urban mobility, traffic engineering and public safety, which in this research will be referred to as BETA. The company has 78 employees, two branches, one in Fortaleza/CE and the other in Caxias/RS, a

manufacturing unit and a research center in the São José dos Campos Technology Park. Beta will be better characterized below.

Data was collected through documentary and field research (Lakatos; Marconi, 2003; Yin, 2001). In the field research, 12 semi-structured interviews were carried out. The interview script was drawn up using the innovation octagon as a reference, given its dimensions relating to strategy, leadership, people and relationships; and Temaguide with its tools aimed at market analysis, technological prospecting, project evaluation, project management and portfolio management.

The questions asked in the interviews refer to the practices and tools used in the different sectors surveyed: RD&I, Development, Commercial, Financial, Human Resources, Technical Consultants and Partners. It was not possible to conduct interviews in the RD&I sector, as Compliance management limits access to a wide range of information as it is a very strategic area for the company.

The participants were: a managing director, an executive director, a contracts manager, a development engineer, a financial officer, a human resources officer and the supervisor of the Fortaleza office. In addition, the president of the Federal University of Ceará's Technology Development Park (PADETEC-UFC) during the period in which the company was incubated, a consultant from the São Paulo Technology College (FATEC) at the São José dos Campos Technology Park (PQTec), a former client, and two software suppliers. The interviews lasted an average of 60 minutes and took place between December 2022 and February 2023. The following table summarizes the information:

Table 2 - Field data collection

Interviewee	Organizations
Founding partner	Beta company
Development engineer	Beta company
Contract manager	Beta company
Head of office in Fortaleza	Beta company
Business partner	EIM LTDA
Customer	AMC
Financial sector (Manager)	Beta company
Partner	PADETEC
Partner (Software area)	CAIS NETWORK
Finance Director	Beta company
Human Resources Human Resources	Beta company
Technical consultant	FATEC

Source: Prepared by the authors, 2023.

Bardin's (2002) content analysis technique was used to process the data collected through the interviews, since it allows information to be categorized and inferences to be made with the literature, making it possible to find the intended results and carry out triangulations. Thematic analysis, among the modalities of content analysis (Bardin, 2002), makes it possible to synthesize the data from observations, inferred in different categories. In this way, the data can be better understood and interpreted more quickly (Lakatos; Marconi, 2003).

In practical terms, we cross-referenced the information obtained in the interviews with the aspects raised in the literature, always guided by the proposed script. We then associated each passage or paragraph with the points in the literature that were relevant to the study, using them in the text whenever they corroborated with the innovation management practices observed. After this process, by

integrating the data collected in a variety of ways, we proposed an innovation management structure for the BETA company. In analyzing the data, we adopted a deductive approach, as we started from a consolidated theory in order to reach specific conclusions (Neergaard; Ulhoi, 2007).

4 RESULTS AND DISCUSSIONS

This section focuses on the analysis and discussion of the results found during the research methodology.

4.1 Characterization of the company studied

As already mentioned, BETA is a provider of intelligence solutions for urban mobility, traffic engineering and public safety. It was created in 1993 as a technology-based company, from a university *spin-off*, and initially designed a system to photographically record some traffic violations, such as running red lights and disrespecting speed limits on the roads (Fotosensores, 2022).

Initially, the organization was incubated at the Federal University of Ceará's Technology Development Park (PADETEC), where it remained until 1995. The company has grown and currently has a new corporate structure, becoming more innovative and expanding its portfolio of new products. This proves the importance of the university-company relationship in the various cycles of a business, especially in companies that are starting out and need support in the field of research and development, which was the case with Beta (Terán-Bustamante; Martínez-Velasco; López-Fernández, 2021; Rossoni; Vasconcellos; Castilho, 2024; Bracht; Neto; Andrade, 2024).

The Research, Development and Innovation unit at the São José dos Campos Technology Park was inaugurated at the beginning of 2012, and supports several of the company's growth lines by contributing to urban mobility solutions. Among the products and services offered are the Fixed Intrusive Radar, Electronic Speed Bumps, Educational Speed Bumps, Traffic Management and Monitoring - Monitran® and the development of the "Big Data" system for processing traffic intelligence information, called "FotoSiga® Public Safety".

4.2 Practices, organizational routines and innovation management

The company's innovation management practices initially followed PADETEC's organizational processes. Since the company had no formal administrative routines, except for customer acquisition routines, innovation groups met periodically and the processes for approving products were determined by management.

A strong move was made in 1998 with the total quality program, ISO-9001 certification and in 2005, when the Process Improvement Program for Hardware and Software Development (MPS-BR) was implemented. The following year, the company implemented ERP Protheus, a tool that interconnects all sectors and employees, facilitating dialogue and ensuring that the defined routines are carried out successfully. In their studies, Quadros (2008) and Gavira *et al*. (2007) already highlighted the importance of using *dashboards* to optimize decision-making, while at the same time enabling the development of technologies and products to be aligned with the company's strategic objectives.

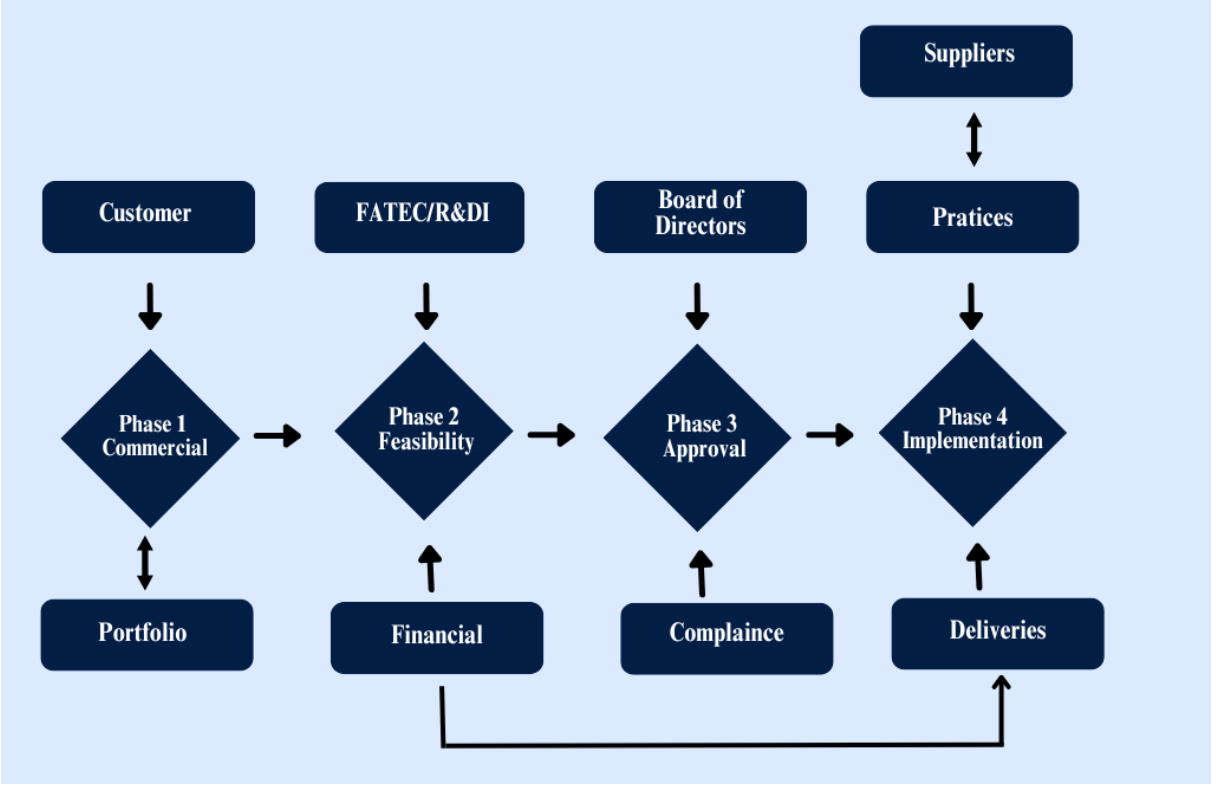
R&D activities were gradually transferred to PQTec in São José dos Campos, and some suppliers and consultants were integrated as partners. The company entered into a process of outsourcing the maintenance, assembly and operation routines of the systems (Guertler; Sick, 2021), orchestrating a

network of partners, based on recognizing their needs for operational and strategic activities, considering the dynamism and complexity of the environment (Lobo et al., 2024a; Lobo et al., 2024b). Instead of playing a secondary role, parts and equipment suppliers actively participate in the entire product creation process (Scherer; Carlomagno, 2016). In other words, the company used to manage innovation by outsourcing operational routines to other companies/institutions. In this context, a partnership with INMETRO created a methodology to certify and give credibility to the product, which highlights the importance of these external partnerships (Desidério; Zilber, 2016; Guertler; Sick, 2021.).

During the last phase of the relocation, there was a major administrative restructuring with a reduction in the number of directors and managers. This process was consolidated with the installation of a *Compliance* Guide, stemming from the Code of Ethics that was created in 2014. Organizational structure, knowledge sharing and diversity, communication, climate, management support and procedures are crucial in innovation management (Singh; Akbani; Dhir, 2020).

According to Schreiber, Silva and Nunes (2021), when a well-defined innovation process is established, with sufficient and clear steps to assess the viability of new product projects before they are launched, it contributes significantly to analyzing opportunities and reducing risks. Innovation management is a cross-cutting process that requires integration and joint work between different areas, which may or may not result in success (Coral *et al*., 2008). Figure 1 shows the innovation management structure identified at Beta:

Figure 1 - Innovation management structure identified



Source: Prepared by the authors (2023)

The process structure identified in the interviews begins with the planning of a set of projects (portfolio), through a disciplined business process, with phases and evaluations. This corroborates Scherer and Carlomagno (2009), who emphasize that innovations must be in harmony with the

company's business strategy, the innovation profile of its sector and its growth intentions (Scherer; Carlomagno, 2009). According to the Managing Director:

> "The company works entirely with the public market, public bodies, municipality, state or union. The routine consists of attracting clients through calls for tenders. Once the tender has been published, it analyzes what is of interest and what is not [...]".

Over the years, Project Portfolio Management (PPM) has become a key element in achieving the strategic objectives of many companies, by supporting the decisions needed to select projects for their portfolios. Through PPM it is possible to organize and prioritize various projects in a single portfolio, which facilitates their management using different models (Loureiro; Goldman; Oliveira Neto, 2018).

As we have seen, the commercial sector attracts customers based on the portfolio developed by the other sectors of the company, taking into account its competencies and business model. In this respect, management integrates relevant facets such as daily activities and actions in the organizational environment, to which attention must be paid in the context of the reality of innovation work (Alves *et al*., 2021, p. 7).

In the second phase, the **feasibility** of the products to be developed is assessed by the R&D departments and FATEC. After the technical evaluations, the financial feasibility studies of the project as a whole are carried out and the "*Business plan*" is drawn up, which is sent for approval by management. In this regard, Sabino *et al*. (2019); Davila, Varvakis and North (2019); and Bollinger (2020) emphasize that strategic knowledge management and management control are a necessity to guarantee the development of innovation, as well as its strategic integration.

According to Stefanovitz, Nagano (2014) and Quadros (2008), the mobilization of internal and external sources corresponds to the decision-making process that leads to the outsourcing or internalization of R&D activities and complementary technology. This decision-making process is based on the organization's competency strategy, which should unfold in a mapping of internal and external knowledge, as well as a plan to cover any gaps and develop future partnerships.

In the third phase, **Approval**, the challenge of decision-making in innovation is even more complex, due to the fact that the nature of innovation involves the unknown, the possibilities and opportunities associated with something new. However, innovation management tries to convert this initial uncertainty into something closer to a calculated risk, taking into account a strategic vision of how a company can best develop (Tidd; Bessant, 2015).

In this new phase, according to the Financial/Administrative Director, financial management has taken on a new status when he points out that it is up to management to decide whether the capital proposal is implemented, the business plan is approved or canceled. Normally, the company allocates resources to its various projects from an annual budget, which supports the company's strategy process. The implementation of projects (internal or external) is supported through the use of financial support mechanisms and incentives (Stefanovitz, Nagano, 2014; Quadros, 2008), as pointed out by the Financial/Administrative Director:

> "Finance participates in all stages of product development, from drawing up the business plan to monitoring the stages of development and delivery, making resources available, providing resources and envisioning the applicability and profitability of the new product/service."

The implementation of the *Compliance* Program has improved management practices, ethical and legal rules, increased legal certainty and improved contract management, in other words, "the routines practiced, built within an organization, define a set of actions that it is capable of doing safely" (Nelson; Winter, 2005).

The Implementation stage sees the influence of the management practices and tools adopted by the company, where projects have an impact on the adoption of new tools and these change the company's practices. Quadros (2008) points out that the innovation management process must involve the entire organization and requires the adoption of specific technological innovation management processes and tools, operated by the functional areas involved, with an emphasis on the R&D and commercial functions. According to the former Director of Research and Development interviewed and current partner:

The company has always sought to implement well-defined processes involving all employees. This was most notable in 1998 when it implemented the Total Quality program (ISO 9001), and in 2005 when it implemented the hardware and software development process improvement program (MPS-BR). With these programs, all actions were documented and explained, making it easier, among other things, to hire a new employee who could learn quickly

The use of OMIE's ERP management software has provided the finance, human resources and purchasing sectors with a system suited to their operations. These tools are used both in the company's own production process and in the selection of suppliers. These, in turn, have had an impact on the management of outsourcing services.

The hiring of a team of researchers and the partnership with FATEC provided the technological support the company needed to continue its innovation process. Academic research can help companies increase their understanding of the fundamentals of particular phenomena, providing a glimpse of new opportunities, especially when the research results can directly influence the innovation that results from university-company cooperation (Hasenclever *et al*., 2020; Zarelli; Carvalho, 2021; Terán-Bustamante; Martínez-Velasco; López-Fernández, 2021).

The **Implementation** phase means putting the innovation project into practice. This stage is not simple, as it requires attention to acquiring the sources of knowledge that will enable the innovation to carry out the project, under conditions of unpredictability, which requires great problem-solving skills and launching the innovation in relevant internal or external markets (Tidd; Bessant, 2015).

The **deliveries** concern contract management. In contract management, the company uses MONITRAN, a multi-platform Traffic Management and Monitoring tool, which remotely monitors the operation and has greatly increased the efficiency of the operation and contract management. At this stage, the financial sector evaluates the results, and the contract management presents monthly statements of investments and forecast results.

According to Scherer and Carlomagno (2016), innovation management starts with creativity, then defining strategies, setting priorities, evaluating ideas, managing projects and monitoring results. Evaluating the innovation management process involves developing and applying metrics for results, the quality of processes and the impact of innovation on the organization, consumers and the environment (Quadros, 2008).

Management practices related to the tactical management of product/process development at Beta are similar to innovation funnels or stage-gate decision-making processes, and their occurrence can be explained by the fact that they are the most widespread among Brazilian industrial companies (Quadros, 2008).

5 FINAL CONSIDERATIONS

The aim of this article was to identify the main innovation management practices in a technology-based company through its innovation structure. The practices adopted were influenced by the market and the company's knowledge base and capabilities. Organizational learning led to the introduction of an organizational model that was not implemented in a ready-made way, but through the development of its practices and competencies.

From the point of view of senior management, it is possible to distinguish efforts in three distinct areas: in training, through the availability of courses; in the application of techniques, through the use of tools such as an ERP linking all sectors and employees, the hardware and software development process improvement program (MPS-BR) and the use of AGILE/ PMI processes; and in the environment: the company has a very lean structure, and processes take place in a simplified way.

Activities are carried out systematically and include Strategic Portfolio Management, risk identification tools, monitoring of clients, the competitive and regulatory environment. The company is open to partnerships with suppliers, customers and competitors to generate new products, services and processes with innovative potential. Its Board of Directors is involved not only with the market, but also with the academic community, developing skills and establishing partnerships.

In the current phase, there is a strong emphasis on financial management, where the short life cycle of products and intense competition in the market have motivated this change in the management process. The high investments in product development, combined with the reduction in payback time, have elevated financial feasibility studies to a position that overrides technical feasibility.

The partnerships adopted by the company come in response to the need to reduce costs and development time. In this case, there is a particularity, as the company does not develop products in partnership, with the exception of the university. The model adopted is one of co-participation, where products developed by the partners are used together with those produced by the company; the technology is not transferred.

We believe that this study has helped to demonstrate the importance of university spin-offs and the relevance of this business model to society. The company researched has demonstrated its ability to absorb the technologies developed and has produced products on the frontier of innovation in its sector. The result achieved was the model shown in figure 1, which represents a hybrid structure, with open innovation processes and classic management in the definition of the portfolio and financial management.

The limitations arising from financial management are a highly important factor to be observed by innovation management companies, especially university spin-offs, since they are strongly influenced by academia, where cost management is deficient. The high investments in product development, coupled with the reduction in payback time, have elevated financial feasibility studies to a position that overrides technical feasibility. These findings discussed in the study point the way to how the innovation management practices discussed can be applied in other technology-based companies and, even better, what the real impacts of these practices are, such as the creation of new products or the development of innovations and market updates.

The limitations of this study are related to the restrictions on data collection, partly due to confidentiality issues and partly due to the change of headquarters. In this case, the researcher had to seek out some former employees to gather the necessary data. Further research is suggested into the impact of reducing the product life cycle on the financial structure of technology-based companies, as well as studies dealing specifically with the technological trajectory of this type of organization.

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